

Collecting River Stage Data

Equipment

1. Non-recording River Gages:

Staff Gage:

A simple non-recording gage that is either vertical or inclined. It can be used as a reference gage in a stilling well, or in a stream as an outside gage.

Wire Weight Gage:

This gage provides a means of obtaining manual readings of river level. The gage is mounted over the water surface and a reading is obtained by lowering a weight suspended on a wire unit, until it touches the water surface.

Float-tape Gage:

This type of equipment is often located inside of a stilling well, and used to record the rise and fall of the water level. A float is attached to a pulley with tape, and the float is able to move with the watercourse level.

Electric Tape Gage:

Functions the same way as the float -tape gage, but when the float reaches the water surface, it completes an electrical circuit.

2. Recording River Gages:

Float Sensor Gage:

The float tape gage described above can be attached to a water-stage recorder to transmit the water level to the recorder.

Pressure Transducer:

A pressure transducer measures the pressure produced by the column of water above the sensing element. The pressure transducer converts the pressure to mechanical movement of a shaft, which can be connected to a recorder and/or a telemetry device. There are two types of pressure transducers: the bubbler type and the sealed system. The **bubble-gage**



sensor consists of an orifice attached to the stream bed through which gas is expelled and a measuring device, which measures the resistance to the release of the gas produced by the column of water above it. The **sealed pressure transducer** also measures the weight of the column of water, but does not release a gas to do so.

Manometer:

Manometers function on the same principle as the bubbler gage. They contain mercury, and thus have been mostly replaced by bubbler gages that are more environmentally safe.

3. Water-Stage Recorders

A water-stage recorder is a device that graphs or produces a punched tape that records the rises and falls in water level. These devices are attached to one of the recording gages described above. There are three types of recorders: analog (i.e. punch tape), digital (data loggers which store data digitally) and graphical (which are being phased out).

4. Telemetry

Telephone:

Limited Automatic Remote Collector (LARC):

Battery powered devices typically attached to water level and precipitation instruments. When queried via a phone line, a LARC powers up to collect, prepare, and then transmit hydrometeorology data to the querying office. After this process, the LARC powers down until called again.

Other Telephone Telemetry

There are a number of devices which can be connected to data loggers and DCPs which provide access to water level data via telephone. Most of these devices can be accessed via computer and/or manual audio means.

GOES Data Collection Platform (DCP):

A DCP transmits hydrometeorology data from a sensor to a master collection station via GOES satellites. DCPs are attached to various hydrometeorology instruments that measure precipitation, temperature, and water level data. They are battery operated and use solar panels for re-charging, which allows them to be located in remote areas.



Radio

Automated Local Evaluation in Real-Time System (ALERT):

This device relies on line-of-sight radio communications between the ALERT station and a base station. An ALERT station consists of equipment to gather hydrometeorology data (including river stage/flow), communications to transmit the data, and computers and software to decode and display the data. This allows an agency/user to evaluate the potential for flooding. ALERT is covered in more detail on page 2.5-1 of this chapter.

Types of River Gaging Stations

Manual Gaging Station:

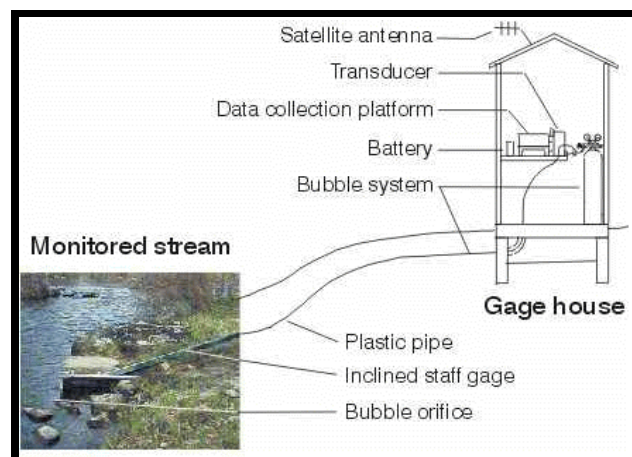
Manual gaging stations include staff gages and wire weight gages. These stations are usually located in the river with no structure.

Stilling Wells:

A stilling well provides protection for gage equipment, as well as decreasing fluctuations in the watercourse caused by wind and turbulence. The stilling well is connected to a watercourse by a series of intake tubes, ensuring that the water level in the stilling well matches that of the watercourse. Most stilling wells are equipped with float type gages.

Pressure Transducer Gaging Stations:

Pressure transducer gaging stations consist of an equipment shelter on the river bank. The bubble orifice or sealed transducer sensor are located in the stream and are connected to the equipment in the shelter by a pipe.



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